

Application/Control Number: 10/618,479

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Art Unit: ***

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CLAIMS 1-5 (CANCEL)

Art Unit: ***

6. An apparatus comprising:

a plurality of pre-drivers coupled to a control circuit to generate pre-driving signals based on control signals provided by the control circuit, the pre-drivers having pre-driver power and ground connections;

a plurality of drivers coupled to the pre-drivers to generate a plurality of output signals based on the pre-driving signals at output pads of an integrated circuit, each of the output signals having a slew rate, the drivers having driver power and ground connections;

on-die pre-driver power and ground planes coupled to the pre-driver power and ground connections on die of the integrated circuit, respectively; and

on-die driver power and ground planes coupled to the driver power and ground connections on die of the integrated circuit, respectively, the driver power and ground planes being separated from the pre-driver power and ground planes to maintain the slew rate.

7. The apparatus of claim 6 wherein the on-die pre-driver power and ground planes are coupled to package pre-driver power and ground planes, respectively, in the package of the integrated circuit.

8. The apparatus of claim 7 wherein the on-die driver power and ground planes are coupled to package driver power and ground planes, respectively, in the package of the integrated circuit.

9. The apparatus of claim 8 wherein the package pre-driver power plane and the package driver power plane share board power plane on a motherboard containing the integrated circuit.

10. The apparatus of claim 8 wherein the package pre-driver ground plane and the package driver ground plane share board ground plane on a motherboard containing the integrated circuit.

CLAIMS 11-15 (CANCEL)

Art Unit: ***

16. A method comprising:

generating pre-driving signals by a plurality of pre-drivers based on control signals provided by a control circuit, the pre-drivers having pre-driver power and ground connections;

generating a plurality of output signals by a plurality of drivers based on the pre-driving signals at output pads of an integrated circuit, each of the output signals having a slew rate, the drivers having driver power and ground connections;

connecting on-die pre-driver power and ground planes to the pre-driver power and ground connections on die of the integrated circuit, respectively;

connecting on-die driver power and ground planes to the driver power and ground connections on die of the integrated circuit, respectively; and

separating on-die pre-driver power and ground planes from on-die driver power and ground planes.

17. The method of claim 16 further comprising connecting the on-die pre-driver power and ground planes to package pre-driver power and ground planes, respectively, in the package of the integrated circuit.

18. The method of claim 17 further comprising connecting the on-die driver power and ground planes to package driver power and ground planes, respectively, in the package of the integrated circuit.

19. The method of claim 18 further comprising sharing board power plane on a motherboard containing the integrated circuit by the package pre-driver power plane and the package driver power plane share.

20. The method of claim 18 further comprising sharing board ground plane on a motherboard containing the integrated circuit by the package pre-driver ground plane and the package driver ground plane share.

CLAIMS 21-25 (CANCEL)

26. A device comprising:

a package having package power and ground connections and output pins to interface to a board having board power and ground planes; and

an integrated circuit on a die coupled to the package, the integrated circuit having a buffer circuit, the buffer circuit comprising:

a plurality of pre-drivers coupled to a control circuit to generate pre-driving signals based on control signals provided by the control circuit, the pre-drivers having pre-driver power and ground connections,

a plurality of drivers coupled to the pre-drivers to generate a plurality of output signals based on the pre-driving signals at output pads of the integrated circuit, each of the output signals having a slew rate, the drivers having driver power and ground connections,

on-die pre-driver power and ground planes coupled to the pre-driver power and ground connections on the die of the integrated circuit, respectively, and

on-die driver power and ground planes coupled to the driver power and ground connections on the die of the integrated circuit, respectively, the driver power and ground planes being separated from the pre-driver power and ground planes to maintain the slew rate.

27. The device of claim 26 wherein the on-die pre-driver power and ground planes are coupled to package pre-driver power and ground planes in the package.

28. The device of claim 27 wherein the on-die driver power and ground planes are coupled to package driver power and ground planes, respectively, in the package.

29. The device of claim 28 wherein the package pre-driver power plane and the package driver power plane share the board power plane on a motherboard containing the integrated circuit.

30. The device of claim 28 wherein the package pre-driver ground plane and the package driver ground plane share the board ground plane on a motherboard containing the integrated circuit.